

REMARKS

This is in response to the Office Action dated February 13, 2003. In view of the foregoing amendments and following representations, reconsideration is respectfully requested.

In the previous Office Action, claims 31 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, claim 31 has been rewritten in independent form. Claim 32 depends on claim 31, and thus is allowable at least by virtue of its dependency.

Next, on pages 2-6 of the Office Action, the remaining claims are rejected as follows:

Claims 26-30, 34 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Grabbe (U.S. Patent No. 5,637,919);

Claims 26-28, 33 and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Rostoker (U.S. Patent No. 5,644,102); and

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rostoker in view of Heckman (U.S. Patent No. 5,467,253).

It is submitted that the present invention, as embodied by amended claim 26, is now clearly allowable over the applied references for the following reasons.

The present invention, as defined in claim 26, can be applied to a component, such as a BGA or CSP, which has a plurality of electrical connecting portions provided on an electrical connecting surface in arrangement positions within a contour of said electronic

component. With such a component, it is necessary to perform the connection operation with a high degree of accuracy, i.e., less than 0.3 mm in position. During a mounting operation, the recognition mark is recognized and then the position can be corrected based on the recognition results. Accordingly, precise electrical connections between the electrical connecting portions of the component and the board can be achieved even though the component has electrical connecting portions that cannot be viewed from the external side. Since the connecting portion cannot be viewed from the exterior side, it is difficult to perform the component mounting operation with a high level of accuracy.

Grabbe, USP 5,637,919 discloses a reference structure (recess/projection) but fails to teach or suggest a recognition mark. In particular, Grabbe discloses a semiconductor chip 10 having large and small diameter projections 46, 48, which are formed on the bottom of the chip and can be received in cylindrical recesses 50, 52 of a support plate 16. This arrangement assures that the contact sites 20 correspond to the contact points of the connection members 18.

However, in Grabbe, the projections are mechanically fit into the recesses for the purpose of positioning and regulating the position of the component 10 on the support plate 16. Clearly, the component cannot be positioned with the necessary precision, i.e., degree of accuracy of less than 0.3 mm, because of the gaps between the projections and the recesses. Thus, the positioning technique, disclosed in Grabbe, cannot be applied to components such as BGA or CSP, which have a plurality of electrical connecting portions provided on the electrical connecting surface in arrangement positions within a contour of said electronic component.

Rostoker, USP 5,644,102 merely discloses a QFP that has a plurality of electrical connecting portions extending outside of the contour of the QFP where a color display showing the feature of the component is shown on the upper surface of the component. Therefore, Rostoker fails to teach or suggest each and every limitation of claim 26, which requires a recognition mark serving as a reference for the arrangement positions of the electrical connecting portions provided on said electrical connecting surface within a contour of said electronic component. That is, similar to Grabbe, Rostoker cannot provide the necessary accuracy to provide an electrical connection between the electrical connecting portions of the component and the board. As indicated above, a component such as BGA or CSP requires ultra-fine accuracy in part because they have electrical connecting portions that cannot be viewed from an external side, and thus it is difficult to perform the component mounting operation with the necessary precision.


Heckman was applied by the Examiner to teach ball grid arrays (BGA). However, Heckman does not disclose or suggest the features that are omitted in the Grabbe and Rostoker references. Therefore, the collective teaching of the applied prior art references do not teach Applicants' invention as defined in claim 26.

In view of the above, it is submitted that the present application is now clearly in condition for allowance. The Examiner therefore is requested to pass this case to issue.

In the event that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for allowance, then the Examiner is requested to contact Applicant's undersigned attorney by telephone to promptly resolve any remaining matters.

Respectfully submitted,

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